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The Contribution that Immunisation Can Make to Preventive Medicine *

General Principles

Prof. T. J. Bosworth: It has been said that the need to resort to immunisation may be regarded as a measure of the failure of the hygienist.

In a sense that may be true, but, in any case, the hygienist has some striking successes to set against his failures. For example, we in this country have become so used to the Diseases of Animals Act being effectively employed to prevent the introduction of serious epizootic diseases from abroad and to eradicate them promptly when they gain admission, that our recent experience with fowl pest has come as quite a shock and, incidentally, a timely reminder that politicians and their lay advisers cannot flout responsible veterinary opinion without seriously endangering the health of our livestock. I only mention this because it seems desirable that the profession should let the public know where the responsibility for the present serious situation really lies.

The present discussion mainly concerns those diseases in the control of which the ordinary well-tried sanitary measures are inapplicable or insufficient; they fail through not taking into account some attribute of the parasite itself or of its relationship to the host. For example, in the case of an organism which can survive for long periods in the soil, or one which normally occurs as a commensal in the host's body, or where the balance between parasite and host is generally such that typical cases of disease are far outnumbered by atypical or inapparent infections and the carrier rate is high, it is evident that attempted eradication or control measures based on segregation may fail to achieve their object. Other methods have then to be considered and amongst these preventive immunisation is widely used to-day. The first principle on which to base our procedure, therefore, is that we be guided by the fullest possible information regarding the life-history of the parasite and its relationship to the host. In passing, it should not be overlooked that there may be cases in which immunisation may be employed as a preliminary measure in the hope of reducing a high initial infection rate to a level at which it would be economical to eliminate the rest of the infected animals. This was the idea which lay behind the introduction of Strain 19 in the Brucellosis control campaign in America and it had also been suggested by Glover in connection with the use of B.C.G. vaccine against bovine tuberculosis in this country.

Procedures of preventive immunisation are directed mainly to the production of active immunity. Their chief interest lies in the principles involved and it is proposed to examine these very briefly. The prime object of vaccination, according to Bordet, is to raise the animal's resistance to a disease to a level comparable with that which would follow its recovery from a natural attack. Jenner attained this end, thanks to his powers of observation as to the remarkable properties of cow-pox virus, and Pasteur opened up the possibility of doing so on a far wider scale when he devised means of attenuating disease-producing organisms and making them suitable for use as vaccines. In all cases the selection of the antigen to be used for immunisation is a matter of primary importance, the object being to confer as strong and lasting a protection as possible, compatible with safety. This involves the use of the actual parasites either living or dead, or their products (toxins) in a fully active or modified form.

Living Agents.—There are many examples in veterinary prophylaxis of living agents being employed. More risk can obviously be taken here than in human medicine, provided that it can be justified by economic results. There are a few well-known examples in past or present practice of living virulent bacteria and viruses being given as vaccines, though only in small doses and usually by a non-natural route, *e.g.*, variola in pre-Jennerian days, sheep-pox, contagious bovine pleuro-pneumonia, fowl-pox, laryngo-tracheitis. More often virulent organisms are injected under cover of serum which considerably reduces, but does not entirely abolish, the risk attending their use.

The commonest way of using living agents as vaccines is, of course, in an attenuated form:—

(1) advantage may be taken of an immunologically related strain as shown by Jenner with cow-pox virus. Doyle's pigeon-pox virus is another example, likewise von Behring's bovo-vaccine against tuberculosis and the vole bacillus as a vaccine against the same disease.

(2) following the lead of Pasteur, use may be made of a strain which has been artificially attenuated in one of the several well-known ways:—

(*a*) by cultivation under sub-optimal conditions, *e.g.*, Pasteur's anthrax vaccines, B.C.G.

(*b*) by adaptation to another species of animal, either with or without a change of tropism, of which method Pasteur's rabies vaccine, Edwards' goat-adapted rinderpest vaccine and Theiler's mouse-brain yellow fever vaccine are perhaps the most famous examples.

Dead Bacterial Vaccines and Toxoids.—It is difficult to point to much conclusive evidence as to the value of killed bacterins in veterinary practice although they are still commonly used, whereas vaccines which are prepared by treating fluid cultures of toxin-producing organisms, particularly clostridia, with formalin and which thus contain dead bacteria, plus toxoid, are quite effective, as also is toxoid alone.

Inactivated or Partially Inactivated Virus Vaccines.—Prepared by treating virus suspensions with such agents as phenol, chloroform, formalin, crystal violet or ultra-violet light, vaccines of this class have been widely used with more or less success in such diseases as rabies, foot-and-mouth disease, dog distemper, swine fever, rinderpest, equine encephalomyelitis and louping-ill. Their value depends very largely on the manner of their preparation which, in the opinion of most experienced workers, is to be regarded as presenting an individual problem in the case of each virus disease. In every case it is essential to choose a virus of good antigenic quality, to use a suspension rich in virus particles, to determine the best method of inactivation and carry out the process under the most favourable conditions and with meticulous care.

Interference Principle.—Much has been heard of this phenomenon in recent years. It has been shown that a virulent virus against which it is desired to immunise may fail to produce its usual pathogenic effect in the presence of another virus of lesser potency to which the host is also susceptible. Some of the best examples are to be found with nearly related viruses, *e.g.*, fowl-pox and pigeon-pox, but the same thing may hold with unrelated viruses such as yellow fever and vaccinia, yellow fever and Rift-valley fever. The rapid protection against field strains of rinderpest virus afforded by goat-adapted virus is thought to be another example of the same phenomenon; protection becomes effective within a day or two and is evidently not due to the production of antibodies. The preventive action of Green's distemper vaccine is similarly explained, likewise the curative effect claimed for it when administered in the very early stages of the disease.

Application of Vaccines.—Certain well-known facts have been established which should be used as guides to the practical application of immunising products.

Glenny and his colleagues have shown clearly that a fundamental principle underlying all ordinary methods of immunisation is that previous experience of an antigenic stimulus causes an animal to react to a further dose of the same antigen in a manner very different from its first response. This was originally reported by him and Südmersen in 1921 with particular reference to antitoxic immunity and has since been studied more widely. Many years earlier Koch had described his well-known phenomenon occurring in the guinea-pig when reinfected with tuberculosis. Glenny's contribution demonstrated that the heightened reactivity shown by an animal to a bacterial product may, under certain conditions, be manifested not by an intense local effect (the so-called allergic response) on further contact with the antigen, but by a greatly accelerated and heightened production of antibody. He distinguished between (1) the primary response of an animal to an antigen manifested by a latent period of about three weeks and maximum immunity being reached in about eight weeks, and (2) the secondary response given by an immune animal to a further injection of antigen which takes the form of a latent period of four days with maximum immunity reached in ten days, *i.e.*, by a great and rapid increase in marked contrast to the small and gradual response to the primary stimulus. These findings apply to a whole variety of animal species and types of toxin and,

* Discussion by the Central Veterinary Society, at the meeting held at the Royal Veterinary College, Camden Town, on December 4th, 1947.

also, to a considerable degree to other bacterial antigens. They should, therefore, be followed as far as possible in practising protective immunisation.

Size of Dose and Time Factors.—It has been shown that increasing the size of the primary stimulus tends to shorten the latent period, whereas too small a primary stimulus results in the response to the secondary one being of an intermediate type and this is, also, the case if the interval between the stimuli is too short. Time is essential for the establishment of a good basal immunity following the primary stimulus—where possible an interval of from three to six months, or even longer, may with advantage be allowed.

The main objective in immunisation has been re-stated in the following terms in a recent article by Barr and Glenny: "The goal to be aimed at in any scheme of prophylactic active immunisation is the production of a permanent level of antitoxin production sufficient to neutralise any toxin formed in the early stages of infection, and such a degree of potential immunity that a rapid rise of antitoxin will ensue sufficient to neutralise all toxin, however severe the infection."

Immunisation of Cattle

Mr. G. N. Gould: My observations on the contribution that immunisation can make to preventive medicine in bovine practice will be based upon present-day use in diseases of economic importance. One cannot but be struck by the limitations of accepted use in the field in this country.

Contagious Abortion.—The vaccine in widest use is one which few will criticise adversely—Strain 19 vaccine for contagious abortion. It has had a profound effect on the incidence of abortion and deserves even wider use. It is an attenuated vaccine, which does not become residual and which does not mutate. Its drawback is the reaction it induces to the agglutination test, particularly in animals over eight months of age, which renders eradication by means of the agglutination test difficult or impossible, where adult vaccination is followed.

The tendency of the 45/20 strain of McEwen in some instances to mutate, to become residual and possibly to be excreted in the milk, together with the lower degree of immunity which it conferred, precluded its preference to Strain 19 in spite of its special quality of not inducing a reaction to the agglutination test. The well-known sequel of abortion infection, whether or not abortion occurs—infertility—is greatly reduced in incidence by vaccinal control of the disease by Strain 19 vaccine and there is no concrete evidence to support the suggestion made from time to time, based on circumstantial evidence only, that vaccination detrimentally affects fertility in animals of any age. It is my opinion that the widest possible—even compulsory—use should be made of Strain 19 vaccination in view of its immediate economic effects in reducing the incidence of the disease, in reduction of infertility as a sequel of infection, in promoting an increased crop of calves and enhancing milking yields so necessary for the well-being of agriculture and the nation.

Mastitis.—Streptococcal mastitis—probably the cause of the greatest loss of milk and a major cause of "culling," particularly in high yielding cows—is unfortunately not capable of control by vaccination. Claims have been made but are not generally accepted and the use of vaccines, in some instances autogenous vaccines, is occasionally boosted, but no satisfactory evidence has yet been produced of their efficiency either as a curative or preventve. Chemotherapy holds the field to-day but the development of a successful vaccine for this and other forms of mastitis—staphylococcal and pyogenes—would render our problems much less formidable. The use of toxoids in staphylococcal and pyogenes mastitis has little, if any, support as methods of preventive medicine although claims for their use as curatives are more readily accepted.

Tuberculosis.—No method of immunisation of cattle for bovine tuberculosis is in common use to-day. B.C.G. vaccine gave some hope of success. Where practised in badly infected herds, vaccinating calves within 15 days of birth and protecting them from natural infection for at least one month after the injection has, it is claimed, given immunity for more than twelve months. Immunity lasts only as long as living B.C.G. organisms exist in the tissues, so that annual vaccination is necessary. Inoculated animals react to the tuberculin test.

More recently a vaccine developed from the "vole" bacillus has been used and some success claimed. Years of observation are required to allow definite evidence to be forthcoming and in the meantime eradication by the tuberculin test makes very slow, but definite progress and will continue to make ground while the financial incentive exists for the milk producer. The development of a successful vaccine would have great value as an interim measure in the heavily 'infected "black areas" of high milk production in this and some other countries.

Johne's Disease.—The method of producing immunity against Johne's disease now being used under field trial conditions in heavily infected herds in the country was elaborated by Vallée and Rinjard. The vaccinec onsists of Johne's organisms from a culture medium suspended in sterile vaseline, olive oil and an inert powder which gives rise to a persistent focus of infection at the site of injection in the dewlap from which immunity may be derived but from which infection of the intestinal mucosa cannot follow. The lesions suppurate in infected animals but not in healthy ones. This form of vaccination seriously complicates the tuberculin test.

It is without doubt a promising method of preventive medicine in heavily infected herds but recent investigation indicates that up to six months of age calves readily contract infection, but after that age are much more resistant, showing that improved methods of animal husbandry, the weaning of calves at birth, the cleaning of all faecal material from udders prior to milking the cows for feeding colostrum or milk to the calf, the segregation of young stock from old, and improved pasture management are probably more practical and more efficient means of disease control in the average herd.

Blackquarter.—A most successful form of immunisation is that for blackquarter—a notable contribution to preventive medicine. The formalised whole culture, which is avirulent and non-toxic, produces a strong immunity in ten days but more recently blackquarter aggressin has been used with complete success.

Anthrax is a scheduled disease in this country but recently certain heavily infected farms in England have been the subject of successful field trials. In many countries throughout the world immunisation, both active by vaccine and passive by serum, is in constant use and enables agricultural economy to continue where otherwise it would fail.

Tetanus.—The use of tetanus antitoxin is a common practice for inducing passive immunity in cattle in this country for producing immunity to tetanus following accidental or surgical wounding. The production of a toxoid for inducing active immunity is a more recent development which has been successful in equine practice, in the army particularly.

Rinderpest is an exotic disease of great importance in world economy It has been claimed by Sir John Boyd Orr that the full and proper application of veterinary preventive medicine would solve the major problems of feeding the world and I had the impression that he had rinderpest in mind when he made this statement. While this disease can readily be eliminated by veterinary police measures, as was shown by its eradication from this country and from Belgium in the 1920 outbreak, the nomadic habits of cattle-owning tribes and the presence of wild game in Africa and other countries abroad present insurmountable difficulties to eradication by sanitary and police measures alone. Vaccination has been a remarkably successful measure in India, where the incidence of the disease is great, using the goat attenuated virus elaborated by J. T. Edwards, but the high susceptibility of the cattle in other countries such as Africa renders this vaccine dangerous and a double simultaneous method has been used successfully and, more recently, a vaccine of formolised or glycerinised spleen pulp. The control of this disease by vaccination is undoubtedly a major contribution that immunisation makes to preventive medicine.

Contagious Bovine Pleuro-Pneumonia causes severe cases in Russia, Asia, Australia and Africa. It was last seen in Britain in 1898 and is unknown in India, New Zealand and Tasmania—South Africa has been free since 1915. Immunisation did not prove effective in Britain but the use of culture vaccines of good antigenic strains has been successful in other countries and other forms of immunisation have been used with varying success.

Haemorrhagic septicaemia of Bovines—a disease very uncommonly met with in Great Britain—is a disease for which immunisation has been used with varying success in those countries in which it is prevalent.

It is my view that there is very great scope for control of bovine disease by vaccination but that the number of bovine diseases for which satisfactory vaccines exist, is small.

Research will undoubtedly add to our knowledge in the future and the rational application of the fruits of that work will be of material assistance in disease control.

Immunisation of Sheep

Mr. F. Blakemore: Immunisation has played an important part in reducing the economic loss from sheep diseases, and the sheep has contributed in no small measure to our knowledge of the principles of immunity. It was in 1881 that Pasteur demonstrated the practical value of active immunisation by showing, in a field trial arranged by the Agricultural Society of Melun, that anthrax could be prevented by vaccination. The success of this experiment led to vaccination against the disease on a large scale in Europe, South America and other countries, and it also helped to convince the public that immunisation was of practical value. The protection of young lambs against lamb dysentery by colostral antibody following immunisation of the ewe, represented another important advance.

Immunisation is successfully practised in this country against several well-known and important diseases. For instance, in Scotland, vaccination against braxy has eliminated the 6 to 7 per cent. mortality which the disease caused in many flocks. Several laboratories supply braxy vaccine, and complete records are not available, but its increasing use is evidenced by the returns of the Moredun Institute. In 1935 this laboratory supplied 63,550 doses and in 1945 production had risen to 185,150 doses. Louping-ill is another disease which has been controlled by immunisation. The vaccine is supplied by the Moredun Institute and 221,810 doses were issued in 1945. If we assume that the mortality from louping-ill is 6 per cent. in affected flocks, then it becomes apparent that vaccination has resulted in a considerable economic saving to the agriculturalist.

The work carried out on the diseases caused by *Cl. welchii* has been of enormous value. At one time this organism was thought to be a single entity, but it is now known that there are several types producing distinct infections. The solution of the lamb dysentery problem some 20 years ago by Dalling and his co-workers was of the utmost importance to the sheep farmers in the border counties because the disease at that time had increased considerably in incidence. It was shown that *Cl. welchii* was the causal organism, and practical methods of immunisation were perfected. The toxins of this and other organisms, identified as *Cl. welchii*, were studied by Wilsdon (1931) and later by Glenny *et al.* (1933), and their work led to a greater realisation of the importance of *Cl. welchii* as an aetiological agent and an appreciation of the immunological factors involved. *Cl. welchii* is also the cause of " pulpy kidney " disease and " struck " and these diseases are also prevented by immunisation.

The use of biological products against diseases caused by *Cl. welchii* is in the main satisfactory, but when dealing with outbreaks of enterotoxaemia, greater attention ought to be given to correcting the management factors which allow the development of the disease. Control can often be effected without the use of expensive serum. There is a need for more diagnostic laboratories and they should be in a position to deal with suspected cases of enterotoxaemia. In the course of routine work at Cambridge many undiagnosed conditions are found to be cases of this disease, and we have often observed it as a complication of other diseases such as parasitic gastro-enteritis. Examination of the intestinal contents for toxin is carried out as the diagnostic test and our results over a number of years substantiate the original observation that enterotoxaemia is usually attributable to *Cl. welchii* (Type D) although atypical cases are encountered occasionally.

There are other diseases against which vaccination is carried out but on a small scale, and about which we have no very precise information. For instance, a vaccine is used against abortion caused by *S. abortus ovis* and satisfactory results are claimed. We have no experimental evidence as to the real value of the product and field trials would be difficult to arrange, since the appearance of the disease in a flock is followed by immunity lasting several years. There are occasions, however, when vaccination may serve a useful purpose, *e.g.*, for use on shearlings and purchased sheep. The vaccination of sheep against contagious pustular dermatitis is also practised to a limited extent. Its value is somewhat controversial but there is little doubt that the vaccine stimulates some immunity and although it may not prevent the disease altogether it reduces its severity.

Immunisation is of no value in preventing infection during early life, which is unfortunate, because it is amongst young lambs that the greatest loss occurs.

What further use can be made of immunisation in the control of sheep diseases ? There is a need for more education amongst agriculturalists so that its benefits can be better appreciated, and the fullest use has still to be made of the veterinary practitioner by the sheep industry. There would also appear to be a scope for the use of biological products for the prevention of diseases such as tetanus of lambs, a disease which is not uncommon in East Anglia following docking and castration and one which could be prevented by antitoxin. Experiments might also be carried out to ascertain whether the use of serum would eliminate *E. rhusiopathiae* infection because this disease is a cause of serious loss on some farms. The prevention of other infectious diseases must await a fuller knowledge of their aetiology or perfection of the biological products employed. This is so in the case of active immunisation against enterotoxaemia and gangrenous mastitis, for although products are available against both there is no indication that they are of any real value.

References

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General Discussion

Mr. Macgregor : He would like to call attention to the remarks that biological prevention of disease was allied to quarantine and hygienic methods and not a substitute. In the last ten or twelve years he had noticed a strong feeling growing up in the Colonial Service that all their problems would be solved if they had a vaccine for each disease : it seemed to be growing up among the veterinary surgeons. Rinderpest was usually quite easily controlled in many parts of the world with veterinary police methods, ordinary quarantine rules and hygiene ; but the difficulty of controlling it was in persuading people to enforce these rules. For instance, Government architects and others had a strong objection to building cattle sheds with cattle facing outwards. They seemed determined to have cattle facing each other, therefore if there was any disease the result was that the animals coughed it into each other's faces. The veterinary profession tended to give way to the attitude that veterinary police, quarantine and hygiene could be substituted with vaccines. He suggested that it was a dangerous attitude to adopt and he warned the profession that it was being adopted. Vaccine or biological control could only be allies to quarantine and hygiene which were the elementary weapons against disease.

Dr. Stableforth : There was one difficulty brought to mind by Mr. Macgregor's statement. Methods of increasing resistance often made it more difficult to diagnose and therefore to carry out an eradication programme because of animals that did not show typical symptoms and yet might carry the disease. Professor Bosworth had said the medical profession did not like using living vaccines ; was that not because of the sanctity of human life ? What counted with animals was what was most effective and economical in the long run. A few deaths might have to be faced. He made no remarks on killed bacterial vaccines. There was some evidence recently of considerable immunity being produced with a killed brucella suspended in an oily vehicle (lanolin-paraffin) but unfortunately they had found the vaccine was not quite of the same value as S.19. Killed products had the advantage also that they could be kept or transported for long distances without danger of dying or deterioration, a difficulty with living vaccine in hot countries and in countries where transport was difficult. Oily vehicles had also been used in Johne's disease and he thought Capt. Doyle had some information.

Dr. Montgomerie : He thought that the discussion so far had relegated immunisation too much to the background. He did not believe it possible in the animal field to put hygienic measures of control on the high plane they occupied in human medicine. Farm animals literally fed among their excreta and in some instances there was little hope of doing much to prevent the spread of infection by relying on hygiene. He believed that it was impossible to lay down principles which could be applied for the variety of diseases. On the one hand, the control of foot-and-mouth disease in Great Britain must be by police measures and on the other that of lamb dysentery, braxy and some other diseases of sheep could, he thought, only be brought about by the practice of flock immunisation. Capt. Boyle had taken anthrax in certain countries as a disease which could only be controlled by immunisation. He believed sufficient had been said to indicate that immunisation had a very definite place but that it was not a panacea for all disease conditions. It might even be that the place of immunisation would become less important as chemotherapeutic methods were developed and applied in those diseases in which hygiene could play only a limited part and active immunisation was of little value.

He had been very interested in the discussion of methods of immunisation and although he wished to avoid raising the hardy annual of standardisation, one of the difficulties was to know the level of immunity which would prove satisfactory in the field. Where the immunity depended on the production of antitoxin one could get a moderate response from the injection of toxoid but it was known that adjuvants could be added to that relatively simple product. For example, alum precipitated toxoid stimulated a higher level of basal immunity than did ordinary toxoid. There was, however, some risk that toxoid to which an adjuvant had been added would cause a much more serious local lesion at the site of injection. One had to try to balance the disadvantage of its serious local reaction against the greater response. It seemed that if one could get a level of immunity sufficient for field purposes with entirely " safe " products there was no justification to use better antigens if they materially increased the risk of a local blemish.

Dr. Stableforth : He thought they would like to know why the use of lanoline-paraffin or alum enabled the agent to act better and how it acted. Was it by localising the vaccinating agents or making them in some way more able to stimulate an immune response ? On the question of Johne's disease vaccine, why was it necessary to vaccinate a second time if the animal could only be infected early in life ?

Miss Uvarov asked if nutrition had any bearing on the development of immunity. She would like to ask Mr. Gould—who thought the only way of getting a reduction of tuberculosis was to take the slow way which they were doing at present—what hope there was of eradication if they were only going to do that and use the present system, and whether the B.C.G. was a possible solution if applied on a small scale. When one considered the position of eradication of tuberculosis in America it made interesting reading and then

when they considered the position in this country it seemed extremely alarming. She hoped that some of the speakers would have said something on the immunisation of small animals; that was the type of trouble that she had to encounter in a small-animal practice. She then referred to the large number of preparations offered to practitioners in small-animal practice and said it rather struck her that with the tremendous number of vaccines there were very few diseases preventable in the small animal—it rather looked as if they would have to go a long way before claiming immunisation in the small-animal as a success.

Dr. Carmichael: In Africa they had depended on immunisation processes for the control of disease and the development of the livestock industry in which there could have been little or no progress if they had relied on ordinary chemotherapeutic methods and ordinary methods of treatment; they would have had no defence at all as far as Africa was concerned. Rinderpest was a good example. It was a good example not only because of the success in Africa but because it was a virus disease and everyone agreed that they got a much more satisfactory answer in virus diseases from immunisation processes than they did from other types of disease. In protozoal diseases they had none whatever and that was something they had to look forward to. In virus diseases they repeated what happened in nature. If an animal recovered from a virus disease it usually acquired a solid immunity and that was what they aimed at with the immunisation process in rinderpest. In the immunisation processes in virus diseases they undoubtedly produced an immune animal and could anyone tell them if they also produced a carrier? It had been suggested that carriers could be produced by immunisation but he did not agree; he did not think there was any evidence or any known example of a carrier being produced in an animal immunised against virus diseases. Dr. Montgomerie might know of a case of a dog successfully immunised against distemper and then proved to be a carrier. As to foot-and-mouth disease, the Mexican outbreak was said to be due to a carrier but he did not think there was any evidence that those animals inoculated with the Waldmann vaccine in Brazil were in fact the carriers.

Mr. Loosmore: He would like to ask if any use could be made of the interference phenomenon in the treatment of contagious pustular dermatitis, using a goat strain on sheep, and *vice versa*, or whether the two strains were too closely allied for this to be of any use.

Mr. Pool: It would be interesting to hear the views of the principal speakers on the importance to be attached to the "negative phase" when giving consideration to mass immunisation at the time an epidemic was raging. He referred to the Croydon epidemic of typhoid fever that occurred a few years ago; the question was debated in the medical Press at that time and certain eminent immunologists were of the opinion that the advantages to be obtained from vaccination of the population at risk were far greater than certain hypothetical dangers relating to inoculation of individuals in the negative phase of immunity as a result of a recent infection.

He referred to the use of vaccination of military horses with tetanus toxoid by certain foreign powers and said he had wondered why it had not been widely used for the horses of our own services. The interference phenomenon had had a profound influence on the results of immunisation against rinderpest in the East. When Pfaff first recorded in Burma that cattle vaccinated against rinderpest were insusceptible to infection within a matter of hours after inoculation the claim appeared to be fantastic and, possibly, to be based on inaccurate observation in some form or other. It was now recognised that the observation was correct and that the explanation was that the virus interference phenomenon was in operation. An important practical advantage in this case was that the army veterinary authorities in India were able during the recent war to regard cattle so inoculated as out of danger of infection within a day or two.

An example of a method of immunisation that had encountered undue opposition was the B.C.G. tuberculosis vaccine. In this country and in North America it met with a storm of abuse and to some extent vested interests accounted for the opposition: the use of a vaccine would have run counter to the policy of eradication by testing and segregation that was then in process. Some of the adverse criticism appeared to be based on an undue worship of statistics. Much of the criticism was of course just. It was significant, however, that after a quarter of a century the vaccine was receiving attention from quarters that appeared to be antagonistic to it in the early years and might have been expected to study its value at that time rather than concentrate on statements of theoretical disadvantages. It was an outstanding example of the manner in which opposition could be roused by optimistic statements of supporters. Had it been launched on a more cautious scale, rather than as "a discovery of the century" it might have received more favourable consideration from the beginning.

The use of live vaccines had been raised that afternoon. When McEwen was working steadily during the 1930s on the live vaccine he later described he received little encouragement and much opposition from those responsible for planning and financing research.

The bogy of setting up active disease with live vaccines was constantly emphasised at that time and it was then taken for granted that such vaccines would not be allowed to be used on cattle because of the danger that live organisms from the vaccines would get into the milk and become a danger to the human population. There was frequent reference to the babies killed at Lubeck in Germany by an improperly made vaccine containing live virulent tubercle bacilli. The phrase "remember Lubeck" almost became a catchword when live abortion vaccines were discussed in committees.

Dr. Montgomerie: In thinking of the negative phase in veterinary medicine might one ask if it could be overcome by the injection of anti-serum at the time of vaccination? There did not appear to be any extensive record of the occurrence of a negative phase in the field but the practitioner commonly wished to have protection against the possibility and the influence of simultaneously injected serum on vaccination to produce an active immunity was an important point.

The Replies

Mr. Gould, replying, said that on the B.C.G. point it was suggested that he rather condemned the use of it in this country, but he had said it could only be complementary to tuberculosis eradication and be used in certain well-known black areas of the country in the preliminary stages of an eradication scheme and might conceivably lead to eradication of this disease in those areas over a period of years. Control of disease necessitated sanitary and hygienic measures which appeared to be applied in this country but not so markedly abroad, but biological methods were complementary.

Prof. Bosworth: He had omitted to refer to adjuvants though he knew there was much evidence in their favour. Their action had been explained on the basis of delayed absorption of the antigen from the site of inoculation; the use of alum gave rise to relatively insoluble compounds which were slowly absorbed and produced a more or less continuous stimulus over a long period. In addition, all adjuvants produced a certain amount of local reaction which also delayed absorption. He knew of the success attending the use of dead brucella vaccine on the experimental scale at Weybridge but did not know how far that warranted its use in the field. He had suggested that there was not very good evidence that many dead vaccines had a particular value in veterinary practice and he thought that any evidence there was should be produced by those advocating them. At the same time he felt that the preparation of effective dead vaccines was something to be aimed at and expected that the people who paid attention to bacterial chemistry would produce suitable dead antigens in due course. Mr. Doyle had suggested that vaccination was the only measure of control for Johne's disease in certain instances. He rather emphasised that there was something of importance in the soil in relation to Johne's disease as some soils favoured its spread and development and on other soils the disease seemed to disappear. He (the speaker) thought that an investigation into the factors concerned in this might afford a real solution of Johne's disease and in the meantime vaccines would be required to hold the disease in check. In reply to Miss Uvarov, while the effect of diet on immunisation as such had been only partially studied there was considerable evidence to show that diet did in many cases influence the susceptibility of animals to disease. He did not think any attempt had been made to exploit the interference phenomenon by using goat virus for the immunisation of sheep against contagious pustular dermatitis. There was not much difference in virulence between goat and sheep strains as far as he was aware, but he would ask Mr. Glover's opinion on this.

Mr. Glover: The goat virus was slightly less active than the sheep virus and slightly less pathogenic but there was not much of a case for using goat virus.

Prof. Bosworth: On the negative phase he thought they might take a chance in veterinary practice and proceed as if it did not exist until they obtained evidence to the contrary. Active immunisation against tetanus had much to recommend it, but he did not know of any large scale use of it among army animals during the war.

CRUELTY TO JACKDAW

At Oxford recently Mendel Smith Yardy, of Merewood Avenue, Sandhills Estate, pleaded "Guilty" to cruelty to a captive jackdaw by cutting its tongue with scissors, and was fined £1 and £2 12s. 6d. costs. Mr. E. H. Holland, M.R.C.V.S., said it was erroneous to think that if the tongue was split it would help the bird to speak.

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Meat production during 1947 in principal livestock countries of the world, exclusive of the Far East, rose 4,000 million pounds from the 1946 output, according to an estimate issued by the U.S. Department of Agriculture. Production for 1947 is put at 65,900 million pounds, which is within 400 million pounds of the 1934-38 five-year average of 66,300 million pounds.—*Meat Trades Journal.*

CLINICAL COMMUNICATION

Sarcoma of the Larynx of a Heifer

P. A. MATHEW,
Brecon
and
K. S. MITCHELL
Student, Royal (Dick) Veterinary College

Subject.—Two-year-old Hereford heifer.

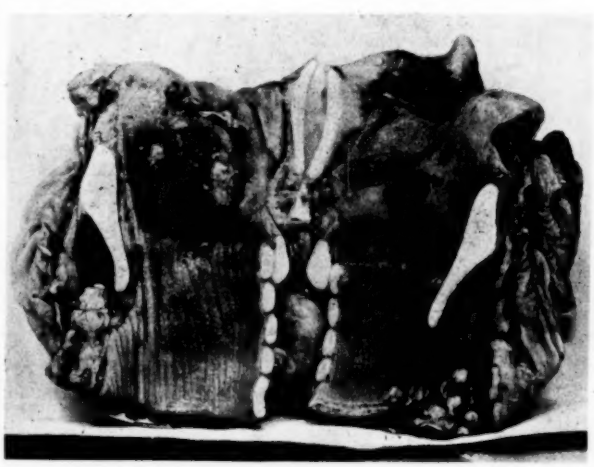
History.—Nothing unusual was noticed by the owner until the morning of September 7th when the heifer showed signs of dyspnoea. This became more severe and veterinary advice was sought, but before we arrived the owner decided that the condition was such as to necessitate immediate slaughter.

Post-mortem Examination showed a healthy, well-nourished carcase, the only abnormality being a tumour of the larynx growing from the two vocal cords, and almost completely occluding the lumen.

The tumour was sectioned by Mr. P. S. Blackburn and reported on as a fibro-sarcoma with infiltration of the muscle fibres, and showing areas of necrosis.

Discussion.—The case is reported because of the comparative rarity of sarcomata in bovines. The tumour must have been of a rapidly growing type, as no symptoms were observed until the larynx was almost completely occluded. Although examination gave no indication of the cause, it is probable that a foreign body may have been responsible.

Acknowledgments.—We are indebted to Mr. P. S. Blackburn, M.R.C.V.S., of the Royal (Dick) Veterinary College, for carrying out the pathological examination; and to Mr. Williams, of Brecon, for the photograph.



ABSTRACT

[Enterohepatitis (Blackhead) in Turkeys. 1.—*Pentatrichomonas* Associated with Enterohepatitis and its Propagation in Developing Chick Embryos. Walker, R. V. L. (1948.) *Canad. J. comp. Med.* **12**. 43.]

Earlier work has shown that *Pentatrichomonas* (so named because of its five anterior flagella) may be found in the caeca of birds affected with enterohepatitis. This article describes the propagation of the flagellate in developing chick embryos. Fertile eggs, which had been incubated for seven days, were inoculated by a variety of routes with a suspension of either the ulcerative lesions from the caeca, or the soft caecal contents, or the liver lesions. Except in the case of the liver lesions bacteriostatic agents were added to each inoculum (5,000 units of penicillin and 1,000 units of streptomycin for each egg). Embryos died 48 to 96 hours after inoculation. No macroscopic evidence of a virus was noted, but wet smears from the crushed yolk sac membrane or yolk sac fluid revealed a prolific growth of *Pentatrichomonas*. Passage through a series of eggs was successful.

A method of staining the organism with Giemsa after preliminary treatment with Weigert's iodine and thymol is described and a short morphological description of the parasite is given.

J. S. P.

REVIEW

[The Care and Management of Elephants in Burma. A. J. Ferrier. Published by Messrs. Steel Bros. & Co., Ltd., 24-28, Lombard Street, London, E.C.3. Price in Great Britain 12s. 6d. net.]

In Burma and Siam where natural conditions have delayed and often prohibited the construction of roads and railways, the indigenous elephant has been one of the chief means of transport from early times. In fact, work in the forests, except in limited areas adjacent to the few modern roads and railways, could not be carried on without this valuable animal. In such countries the elephant's food requirements are present in the forests in which it works, and transport animals are usually set free each evening and during periods of rest to forage for themselves, fettered and with a drag-chain attached to the hind leg to facilitate tracking and rounding-up when required. In these circumstances the elephant costs little to keep and his return in hard and patient labour has contributed in no small measure to the former prosperity of the teak industry in these countries.

To keep elephants fit under the working conditions which obtain is a comparatively simple matter provided commonsense rules are observed, and Mr. Ferrier's little book compresses his 27 years' experience into 180 pages of sound practical information. The literature on the subject is really very scanty, but the author has utilised the available sources from Colonel G. H. Evans to the more recent work of Messrs. G. Pfaff and J. H. Smith of the Burma Veterinary Service, and has sought the advice of several experienced members of the various timber firms, the Forest Department and the Veterinary Department in Burma.

The book is well arranged and the management of elephants in health and their care in sickness are dealt with in separate parts. Part I contains a great deal of general information about elephants as well as details of their management, working gear and diet. In Part II there is little to be criticised from the veterinary point of view. The author has obviously been guided by the advice of the officers of the Veterinary Department in his treatments and in his writing. That persons having charge of these animals should possess a sound working knowledge of the commonest diseases and of the priniciples of first-aid is even more necessary under the forest conditions in Burma than in the case of animal owners in more developed countries, for their work is in inaccessible places and expert advice is not always at hand. In the short comments on the book published in the House Magazine of Messrs. Steel Bros. & Co., Ltd., Sir Frank Ware refers to piroplasmosis and rightly remarks that no authentic case of elephant piroplasmosis has yet been recorded. He also says that it is misleading to suggest that the elephant can suffer from the cattle form of the disease. In fairness to the author it should be noted that he refers to the deaths of seven animals in 1923 in which piroplasms were reported in blood smears by the Veterinary Laboratory at the time. He goes on to say that two veterinary officers subsequently expressed doubt as to the accuracy of the diagnoses and that not only does Evans fail to record a case of piroplasmosis in the elephant, but that since 1926 the Veterinary Department has not seen a single case. He concludes that little is known about this disease in elephants and that it is either very rare or non-existent. The implication that elephants may suffer from cattle piroplasmosis is unfortunate.

Conditions in Burma have changed vastly since the end of the war. To-day far fewer Europeans are directly concerned with forest work and the use and care of elephants than was formerly the case. There is no question, however, that teak will remain in world demand and will continue to be exploited. The elephant will for a long time be indispensable and wherever this useful animal is employed, be it in Burma, Siam, India or Ceylon, this book should find a place in the forester's specialised library. The author remarks that the form of the book renders it suitable for translation into Burmese and this should also apply to other oriental languages.

It is to be hoped that as Burma and other eastern countries progress along the modern road their people will learn to exploit their natural resources with due regard to scientific conservation and that animals like the elephant will be used with humanity and efficiency. The conservation of the forests and of wild animals as well as the humane treatment of domestic animals are among the really valuable legacies of the British association and it is books such as this that will help to keep this tradition alive.

Weekly Wisdom

There may be a decent loyalty in the obstinate conservatism of the reactionary.—Dr. W. R. Inge.

NOTES AND NEWS

Diary of Events

Sept. 8th to 15th (inclusive).—N.V.M.A. Congress at Southport.

Sept. 11th.—13th Annual Meeting and Dinner of the Royal (Dick) Veterinary College, Alumnus Association at Southport (Prince of Wales Hotel), 7.30 p.m.

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N.V.M.A. Congress Ticket Applications

Members who have not yet done so are requested *as a matter of urgency* to send in their applications at once for tickets for the Congress functions, excursions, etc., in which they wish to participate.

PERSONAL

Appointments.—The Colonial Office announces the appointment of Mr. Harry Cronley, M.R.C.V.S., D.V.S.M., D.T.V.M. (EDIN.) D.D.V.S., Uganda, as Director of Veterinary Services, Uganda; also of Mr. A. D. Campbell, M.R.C.V.S., as Veterinary Officer, Nigeria.

Mr. D. L. Hughes, M.R.C.V.S., DIP.BACT. (LOND.) has been appointed by Boots Pure Drug Co., Ltd., as Head of the Division of Veterinary Science in succession to Mr. K. D. Downham, B.V.SC., M.R.C.V.S., D.V.H., who vacated the post on June 30th, 1948.

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Accident.—We regret to learn that Mr. Geoffrey J. H. Moon, veterinary surgeon, formerly of Ryde, who recently emigrated to New Zealand, has had a serious accident. When a pile of tree trunks slipped, one of the logs crushed his leg, fracturing the right femur in two places. It is expected that Mr. Moon will be in hospital for about nine months. His address is: Ward 2, Middlemore Hospital, Otahuhu, near Auckland, N.Z.

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BEQUEST TO THE ROYAL VETERINARY COLLEGE

Will.—Mr. Edward Thomas Stanley, M.R.C.V.S., of "Normanhurst," Dulwich Village, retired veterinary surgeon, left £34,435, with a bequest of £1,000 to the Royal Veterinary College.

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R.C.V.S. OBITUARY

PERKINS, Percival, The Rockery, The Moor, Hawkhurst, Kent. Graduated London, May 21st, 1891. Died July 31st, 1948; aged 77 years.

THOMSON, William Gladstone, Capt. late R.A.V.C. (T.F.), 53, Eastgate Street, Stafford. Graduated Edinburgh, December 16th, 1907. Died July 22nd, 1948; aged 63 years.

MR. PERCIVAL PERKINS, M.R.C.V.S.

We record above with much regret the death of Mr. Percival Perkins, a highly esteemed practitioner, who passed away at the Kent and Sussex Hospital, Tunbridge Wells, on July 31st.

As a student at the London College he was awarded a Certificate of Distinction in the Diploma examination. He then practised for almost 50 years at 43, Havelock Road, Hastings, Sussex, until his house was destroyed by enemy action in 1941. Mr. Perkins then moved to Hawkhurst, where, although stricken with a serious and incurable complaint during the last eighteen months of his life, he continued to be actively engaged in his work until his death, seeing clients while lying in his bed and often being taken by taxi to visit outlying farms.

Deep sympathy is felt for the bereaved—Mrs. Perkins and three children.

The interment took place at the Hastings Borough Cemetery on Thursday of last week.

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REGISTER OF VETERINARY SURGEONS, 1948

The Registrar, R.C.V.S., regrets to inform readers that a serious error in the printing of the Register has resulted in the omission of the entry relating to Miss M. G. Jordan, M.R.C.V.S., and the duplication of the name of Mr. W. J. Jordan, B.SC., M.R.C.V.S.

The following details are therefore notified for inclusion in the Register for 1948:—

JORDAN, Marjorie Gertrude (Miss),
53, High Street, Dorking, Surrey.
Qualified at London, 16th December, 1931.

The correct entry for Mr. W. J. Jordan should read:—
JORDAN, William Johnston,
University of Liverpool Veterinary Field Station,
Leahurst, Neston, Wirral, Cheshire.
Qualified at Edinburgh, 11th July, 1946, B.Sc. (Vet.Sc.), Edinburgh.

THE ANIMAL HEALTH TRUST

SCIENTIFIC CONFERENCE AT NEWMARKET

On July 27th to 29th, all the scientific workers either attached to the staff of the Trust's Research Stations or working independently at universities and other centres under the auspices of the Trust met at the Newmarket Research Stations to discuss freely the lines along which the researches are developing. There were gathered together some 23 research workers, and the discussions ranged over a variety of topics from those concerned with the metabolic diseases of dairy cattle to the nervous diseases of dogs. Parasitic conditions in horses and poultry, Salmonella infections of all animals, infertility in the mare, nutritional problems of the sheep and dog, various surgical conditions, and a variety of pathological problems were included in the three-day programme. These are all lines upon which Trust investigators are working, but the work is still in its early stages and hence the free discussion proved of great service to the individual scientists.

In addition, the laboratories and stations were inspected and the development projected outlined. The use of the Electro-cardiograph was demonstrated in both the horse and the dog, and the cinematograph films on Sterility in Cattle and a number on nervous diseases in the dog were shown. At Lanwades Park the first batch of worm-free foals that are being reared on the worm-free paddocks were examined, and it was generally thought that they were making better progress than is normal.

The assembled group of workers included not only English, Scottish and Irish workers, but also a worker from New Zealand and another from Australia.

This meeting was the first of the informal scientific discussions to take place as a regular part of the scientific programme of the Trust, and which are planned to play an important part not only in the stimulation of current research projects, but also in the training of the younger research workers. All expressed a desire for the continuation of these meetings, those coming from Scotland and the North being equally enthusiastic.

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APPOINTMENT OF EXPERIMENTAL SURGEON TO THE EQUINE RESEARCH STATION, NEWMARKET

As briefly announced in our last issue, Mr. John Hickman, M.R.C.V.S., Reader in Surgery at the Royal Veterinary College, has been appointed to take charge of the Surgery Department of the Equine Research Station. In this capacity he will be in charge of all surgical work including experimental surgery, X-ray work, and the use of electro-cardiography.

Mr. Hickman qualified M.R.C.V.S. from the Royal Veterinary College in 1935, becoming surgical assistant to the late Sir Frederick Hobday. He joined the Royal Army Veterinary Corps at the outbreak of World War II, attaining the rank of Lieut.-Colonel. Whilst in the Army he was able to carry out an investigation upon sterility of mule mares and stallions in the mule and horse-breeding area of the Punjab, India. He published six papers upon this and other work in connection with horses.

Before taking up his appointment at Newmarket, the Trust has arranged for Mr. Hickman to spend several months in the United States. In the first instance he will go to the Mayo Clinic, the foremost centre for human surgery in the States. Here he will study the methods there employed and carry out certain experiments on veterinary problems. Subsequently, he hopes to visit Kentucky and the breeding schools and centres of the thoroughbred horse in America and gain experience of American methods of infertility control. He will return to Newmarket in the spring of 1949, by which time it is hoped the surgical unit will be ready at the Equine Research Station.

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INSULIN PRODUCTION

A survey of the world production and consumption of insulin has been published by the World Health Organisation. By means of a questionnaire, it was found that the total consumption of 44 countries amounts to 3,901 million international units. The estimated consumption for the next ten years is approximately 46,425 million units. The present production of insulin, about 11,087 million units, comes mainly from the United States, the United Kingdom and the Netherlands. It is estimated that the total production for the next ten years may reach 115,250 million units. The estimate for future consumption does not include the United States, which uses most of its own insulin production and exports a relatively small quantity.

Increased production is being encouraged by various means, including compulsory collection of pancreas of slaughtered animals; granting of subsidies to encourage collection; provision of refrigerators to slaughterhouses; and official control of slaughterhouses in

the United States. Recent research has shown that the cod pancreas is very rich in insulin, but the cost of extraction is about 150 times greater than that from animal glands.

Thirty-four of the countries included in the questionnaire did not produce enough insulin for their own needs; their import requirements were estimated at about 1,854 million units. The deficit of 424 million units will probably be covered by the surplus production of the United States and by an increased yield.

Writing on this subject in *The Times*, Mr. John C. Hanbury, Chairman of the British Insulin Manufacturers' Association, states that the production of insulin in Britain is sufficient to meet in full both home and export demands. Mr. Hanbury expressed surprise that the United States have only a small exportable surplus for British manufacturers are meeting American competition in most of the important markets of the world.

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Eight out of ten blacksmiths' businesses in the country are one-man firms with no one to follow. The average age is between 55 and 65. Mr. J. G. Kerr, organising secretary, gave this information to Worcester branch of the Master Farriers' and Blacksmiths' Association. It was serious that the blacksmiths' trade was dying out.—*Farmer and Stock-Breeder.*

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Tuberculosis (Attested Herds) Scheme

Statement Showing Position of "Attested Herds" in each County as at June 30th, 1948

County	Total Cattle as at 4.6.47	Certificates of Attestation in force as at 30.6.48	Number of Cattle covered by Certificates of Attestation as at 30.6.48	Percentage of Attested Cattle to Total Cattle
Bedford	45,187	65	4,043	8·9
Berks	79,656	353	20,639	25·9
Buckingham	106,371	183	11,248	10·6
Cambridge	29,310	65	3,825	13·1
Isle of Ely	18,937	18	780	4·1
Chester	235,479	319	18,043	7·7
Cornwall	250,224	272	10,609	4·2
Cumberland	209,000	934	45,416	21·7
Derby	178,926	141	7,922	4·4
Devon	374,657	452	19,393	5·2
Dorset	137,196	442	25,763	18·8
Durham	111,203	269	11,688	10·5
Essex	120,106	386	20,636	17·2
Gloucester	174,888	308	17,765	10·2
Hampshire	139,381	487	25,301	18·2
Isle of Wight	19,992	40	1,807	9·0
Hereford	125,017	210	12,127	9·7
Hertford	57,286	178	12,120	21·2
Huntingdon	27,631	23	1,875	6·8
Kent	117,619	291	14,797	12·6
Lancaster	267,975	350	16,373	6·1
Leicester	154,580	126	7,198	4·7
Lincoln (Holland)	25,769	—	—	—
Lincoln (Kesteven)	67,455	15	738	1·1
Lincoln (Lindsey)	156,173	36	1,827	1·2
London	120	—	—	—
Middlesex	7,024	19	1,125	16·0
Norfolk	171,977	249	18,625	10·8
Northampton	145,281	74	4,739	3·3
Soke of Peterborough	7,082	—	—	—
Northumberland	181,836	217	12,350	6·8
Nottingham	107,240	77	3,934	3·7
Oxford	97,376	378	20,468	21·0
Rutland	20,071	11	625	3·1
Salop	261,162	333	20,691	7·9
Somerset	297,602	606	33,035	11·1
Stafford	223,893	128	6,620	3·0
Suffolk, East	75,125	117	6,550	8·7
Suffolk, West	34,021	103	7,010	20·6
Surrey	49,448	253	12,606	25·5
Sussex, East	100,836	258	11,695	11·5
Sussex, West	67,241	206	10,573	15·7
Warwick	144,176	156	9,401	6·5
Westmorland	90,754	722	32,384	35·9
Wilts	183,626	294	20,691	11·3
Worcester	93,899	115	6,552	7·0
Yorks, East Riding	124,949	34	1,260	1·0
Yorks, North Riding	231,274	454	16,933	7·3
Yorks, West Riding	329,835	504	21,078	6·4
England	6,275,866	11,271	590,788	9·4
Anglesey	53,766	36	1,485	2·8
Brecon	43,363	147	5,382	12·4
Caernarvon	58,435	142	4,966	8·5
Cardigan	70,699	3,467	53,326	75·4
Carmarthen	124,842	4,337	85,363	68·4
Denbigh	95,340	420	11,278	11·8
Flint	57,897	70	3,203	5·5
Glamorgan	70,704	164	4,539	6·4
Merioneth	38,851	874	16,898	43·5
Monmouth	63,949	134	5,768	9·0
Montgomery	90,615	341	12,624	13·9
Pembroke	95,126	1,652	35,936	37·8
Radnor	35,159	48	1,260	3·6
Wales	898,746	11,832	242,028	26·9
England & Wales	7,174,612	23,103	832,816	11·6
Aberdeen	206,252	127	11,702	5·7
Angus	58,018	84	8,853	15·3
Argyll	59,974	442	15,893	26·5
Ayr	144,734	2,035	122,042	84·3
Banff	50,072	27	2,114	4·2
Berwick	29,164	37	2,800	9·6
Bute	10,446	337	9,032	86·5
Caithness	24,667	137	2,513	10·1
Clackmannan	4,295	26	1,805	42·0
Dumfries	94,113	1,169	62,999	66·9
Dunbarton	16,046	185	9,520	59·3
East Lothian	14,057	28	2,076	14·8
Fife	57,845	231	15,320	26·5
Inverness	50,261	54	2,840	5·7
Kincardine	33,736	32	3,177	9·4
Kinross	7,749	39	2,286	29·5
Kirkcudbright	69,070	678	45,068	65·2
Lanark	90,691	1,051	57,174	63·0
Midlothian	22,157	151	6,891	31·1
Moray	27,775	40	3,242	11·7
Nairn	7,923	15	1,058	13·4
Orkney	45,301	147	3,443	7·6
Peebles	10,564	137	5,548	52·5
Perth	81,639	172	11,576	14·2
Renfrew	30,780	323	17,532	57·0
Ross-shire	36,928	36	1,830	5·0
Roxburgh	30,545	40	2,760	9·0
Selkirk	5,268	24	1,050	19·9
Stirling	39,488	308	15,760	39·9
Sutherland	9,559	21	452	4·7
West Lothian	14,213	97	4,893	34·4
Wigtown	67,666	464	42,085	62·2
*Zetland	7,608	1,948	6,569	100·0
Scotland	1,458,604	10,642	501,903	34·4
Great Britain	8,633,216	33,745	1,334,719	15·5

* All cattle herds in Zetland are attested. This figure represents the number of animals in the last test of the herds.

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THE CONTROL OF POULTRY DISEASES AND RECENT POULTRY LEGISLATION

British Government's Co-operation in Irish Scheme

In its June issue *The Irish Veterinary Journal* reports that, lecturing to the quarterly general meeting of the Veterinary Medical Association held in Dublin on May 5th, Professor W. Kearney said that the Government had recently decided to develop the poultry industry in the country to the fullest possible extent, in the shortest possible time, in order to step up the output of eggs and flesh for the home and overseas market. In this drive they were being aided financially and by expert help and advice by the British Authorities and a large sum of money, nearly £3,000,000, had been approved for the project, of which the British Government was to contribute half.

The basis of this new scheme was the establishment of commercial hatcheries, up to 100 eventually, in various parts of the country, to augment the present system of private hatching. In these hatcheries, a number of which were already working, several thousand eggs could be incubated at a time, and upwards of 8,000,000 to 10,000,000 chicks annually were expected from them. As the eggs in these large hatcheries were hatched out, the chicks, as day-olds, were to be distributed to approved private breeders for rearing, and subsequently selected pullets from their stock would keep the hatcheries supplied with further eggs. The premises of some 1,000 approved breeders, officially known as egg supply farms, were now being selected, and these breeders were to receive grants from the Government through the County Committees of Agriculture to help them to get going as quickly as possible.

"This new activity," proceeded Professor Kearney, "if left to the devices and uncontrolled practices of those engaged in it, would undoubtedly lead to undesirable exploitation of private breeders as well as of the industry as a whole and would almost certainly lead to the spread of disease. Already we have evidence of that from the hatcheries that have been functioning during the past few years. Consequently, the Government recently passed a Bill through Parliament called the Poultry Hatcheries Bill to enable the authorities, central and local, to exert control over the hatcheries and the scheme as a whole. Under this Bill the health of poultry is to receive special attention and already steps are being taken to engage special staff for that purpose, including lay technicians and veterinary supervisors.

"In Great Britain veterinary supervision in a somewhat similar scheme is conducted by the Divisional Veterinary Inspectors of the Ministry of Agriculture, but here, where there are no such inspectors as yet, it has been decided to appoint special whole-

time veterinary supervisors. In addition to this veterinary supervision in the field a Veterinary Diagnosis and Advisory Service will be maintained in Dublin. Later, no doubt, a further extension of this veterinary service will be necessary and other members of the profession may be called upon to take part in it. In Holland and Denmark many private practitioners are engaged in the diagnosis of disease among poultry flocks and advising owners about their prevention and treatment. It may well occur in time that the profession here may be engaged also in work of this kind in which event adequate knowledge of the prevailing poultry diseases will be necessary and it is for that reason in particular that this lecture was considered advisable at this time."

Professor Kearney then illustrated on the screen the diseases encountered in specimens reaching the Poultry Pathology Laboratory in the College last year, expressing indebtedness to Mr. Adams the Poultry Pathologist for the list. "It is a formidable list as you see, and the many complaints comprising it reveal the complexity of poultry diseases. Fortunately, with the exception of B.W.D., these diseases are relatively quiescent at present and no undue concern need be felt about them. But B.W.D. has become a menace in the past two years and is at present spreading rapidly through the uncontrolled distribution of infected eggs from the commercial plants that have not yet been brought under Government control. The intention is to concentrate on B.W.D. for the present and by the application of the agglutination test in the field by what is known as the rapid test and in the laboratory by the tube test to eliminate as many carriers as possible within a short time.

"The field test is to be carried out by specially selected and trained girls, using mobile laboratories, and working under the direction of a veterinary supervisor. They will concentrate at first on the commercial flocks which are the most likely means of spreading the disease but later private flocks will be included as well. The laboratory test will continue to be applied to flocks convenient to Dublin and as a check on the first test."

At the conclusion of his lecture Professor Kearney showed pictures of the principal poultry diseases and commented on their diagnosis, prevention and treatment. Mrs. K. M. Lowndes, M.R.C.V.S., of the College Poultry Department, then demonstrated the field test for B.W.D.

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THE "NICKING" OF CRABS

From the report presented by Mr. R. Glave Saunders, M.R.C.V.S., in his capacity as Hon. Secretary of the Exeter, East and West Devon Branch of the R.S.P.C.A., we learn that further progress has been made in the solution of "the little problem sent from Headquarters" following upon the receipt of a complaint that the fishermen at Brixham on catching crabs cut a tendon serving the claw, in order to prevent them from biting their captors or injuring each other. The Society's informant suggested that this was a case of cruelty and should be stopped. Mr. Glave Saunders quotes the following opinions obtained on the subject from three authorities—Dr. John R. Baker, of the University Museum, Oxford: "Since the operation makes the crab much less able to cause pain to other crabs, and is not likely to be itself very painful, I do not consider that steps should be taken to prevent the operation from being performed." Mr. F. S. Russell, Director and Secretary to the Council of the Marine Biological Association of the United Kingdom: "Recent research indicates that pain is a mental attribute for which a very highly organised central nervous system is required. Certainly no invertebrate animals have brains of sufficient complexity." Mr. P. D. Wilson, Zoologist to the Marine Laboratory at Plymouth: "I think it highly improbable that invertebrates and crabs in particular feel pain in the way we do. They react to external stimuli and retract and retreat from things that might do them harm, but it does not follow that they thereby feel pain. With the specific question of the crabs' claws, I think that if the operation performed by the fishermen was such as seriously to irritate the crab it would at once throw off its claws entire, as it throws off claws and legs when they are trapped or crushed. A special breaking plane situated at the base of the limb enables them to do this. The fact that the claws are not thrown off indicates that the crab is not seriously concerned. They freely throw off their claws and grow them again; they would hardly do this were it a painful process."

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VETERINARY INSPECTION OF EAST SUSSEX RIDING SCHOOLS

Termed "a step in the right direction" by Lt.-Col. R. V. Gwynne (General Purposes Committee Chairman) the East Sussex County Council decided at a recent meeting (reports the *Kent and Sussex Courier*) to appoint nine veterinary surgeons, who will pay four visits each year to riding establishments in the county to ensure that unfit horses are not hired out. Colonel Gwynne said the decision would lead to better treatment of horses which were not always used as they should be in some riding establishments in this country.

Pointing out that permissive legislation had existed for some years, Mr. T. P. Dunlop commented that up to the present no steps had been taken. "My opinion is that no steps are necessary," he added. "The police are constantly on the look-out for horses which are in an unfit condition. If veterinary surgeons go to riding establishments they can only inspect the horses which are at home—which is where they should be if they are unfit. It seems to me the whole thing is largely a waste of money." He proposed, in the interests of economy, that the visits should be cut to two each year.

Colonel Gwynne said the sub-committee had evidence before them which convinced them that inspection was overdue. "It is high time we put our house in order," he said. "It is more than ever necessary now because riding establishments are unable to get corn for their horses. Anyone who goes about can see the miserable condition of some of these horses."

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ADVERTISER'S ANNOUNCEMENT

Penicillin Veterinary Cerate

On August 9th Glaxo Laboratories, Ltd., of Greenford Middlesex, introduced Penicillin Veterinary Cerate Glaxo for the treatment of bovine mastitis. The cerate is supplied in boxes containing 16 tubes, sufficient for a four-day course of treatment for one cow. Each tube contains a single dose of 100,000 international units of penicillin. The penicillin is presented in a non-irritant base of arachis oil with 4·5 per cent. white beeswax to secure a steady and prolonged action in the udder.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the N.V.M.A.

Correspondents are requested to write as briefly as possible

EFFICACY OF PASTEURISATION

Sir,—There is a constant and insistent demand by a large section of the public, including a considerable proportion of the medical profession, that all milk should be pasteurised. There is an equally insistent demand by perhaps a smaller number that it should not be. The former group point to the distressingly large number of cases of tuberculosis alleged to be of bovine origin, especially among children, and insist, quite rightly, that milk should be made safe. Both groups are in agreement that milk should be safe. It is fair to assume that no one desires the destruction of children by this horrible method. But the members of the lesser group have considerable doubt on the point as to whether pasteurised milk is in fact safe. As a member of the smaller group may I say why such doubts persist in my mind. If I am wrong, I shall gladly join with the majority.

Many years ago, when acting as personal assistant in bacteriology to the late Professor Mettam it was one of my duties to assist him in the preparation of tuberculin. At that time the method of preparing it was to grow a culture for some weeks, after which it was sterilised in an autoclave. In order to make it "safe" for the preparation of tuberculin it was found necessary to keep it for at least 30 minutes at a very high temperature, much above boiling point, in about two atmospheres of steam pressure. If such intense sterilisation was necessary to make the culture safe for tuberculin it is difficult to believe that warming milk to 145° to 160° F. can make it safe for children.

This doubt is reinforced by the letter of Mr. Johnson in your issue of July 17th, where he speaks of the danger of inducing primary tuberculosis of the udder by the use of instruments insufficiently sterilised, even when used by research workers. He says, quoting from another letter, that it is difficult to sterilise apparatus against the tubercle bacillus. Again, he says, "If this second paragraph is true, then despite the routine boiling for 30 minutes which one normally carries out, . . . there is still risk of spreading the disease."

Until these doubts can be set at rest one must regard pasteurisation with the same dislike and distrust which one had for the league of nations, and for whitewashing cowsheds, and for the same reasons, namely, that although excellent in conception they gave a false sense of security, when in fact the nations, the cowshed and the milk are not really safe.

It is time that some irrefutable evidence was produced on this point.

Yours faithfully,

Cirencester. ALEX. C. DUNCAN.

July 27th, 1948.